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(56) Documents Cited

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(58) Field of Search

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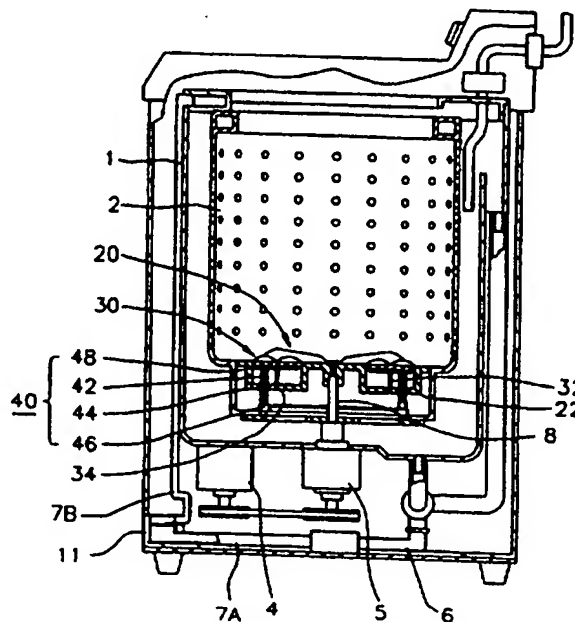
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(54) Clothes washer having a pulsator apparatus

(57) A clothes basket having a pulsator apparatus comprising a first pulsator 20 disposed above a bottom portion of a clothes basket 2 and rotated by a motor 4. A driving gear wheel 42 is provided rotatably in the first pulsator 20. Rotation of the driving gear wheel 42 causes a second pulsator 30 meshed with it to rotate. A ring shape idle gear 46 guides the rotation of the driving gear wheel and is positioned on the bottom portion of the clothes basket 2. Rotation of the pulsator 20 moves the gear wheel axis so that the gear wheel is caused to rotate. The wheel 42 may have a rubber rim, in which case it engages rubber parts. In an alternative embodiment (Fig 3) the second pulsators are driven via a turbine (140) that is driven by the swirl of the washing liquid.

FIG. 1



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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FIG. 1

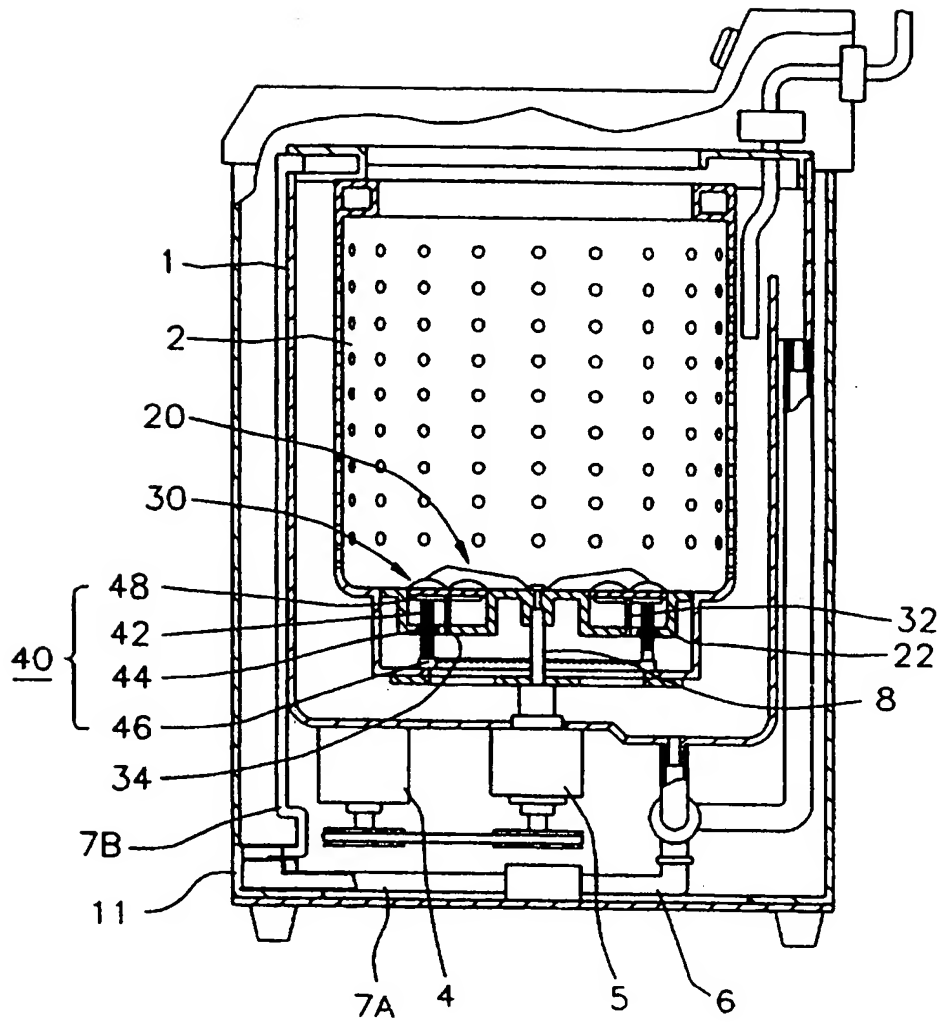


FIG 2

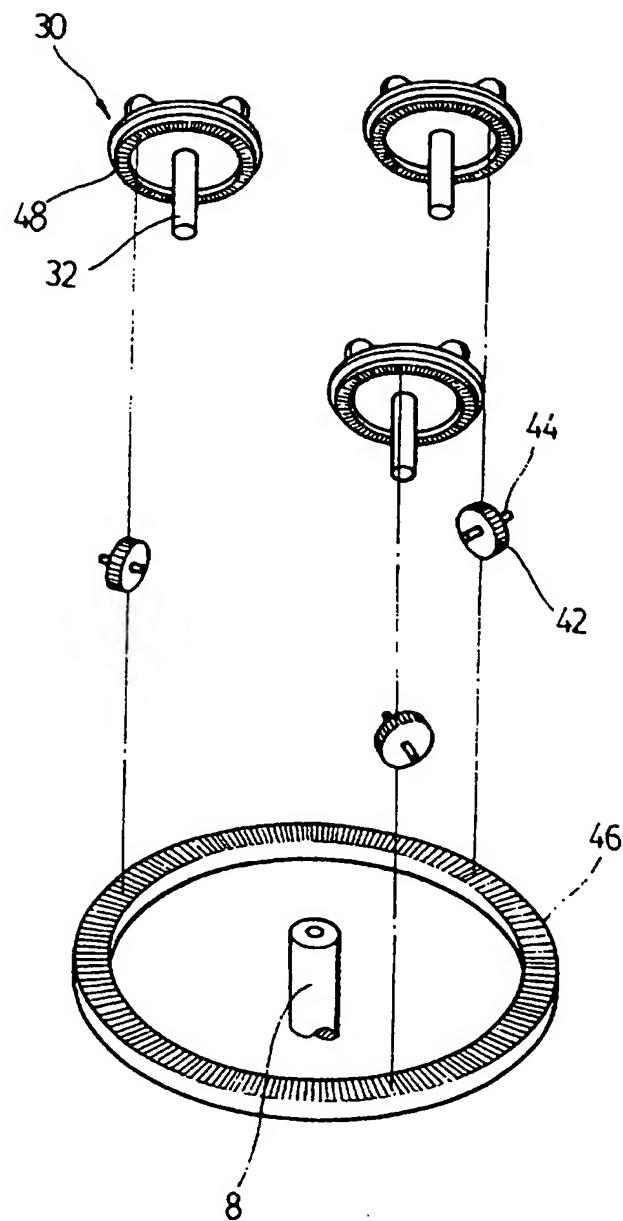


FIG.3

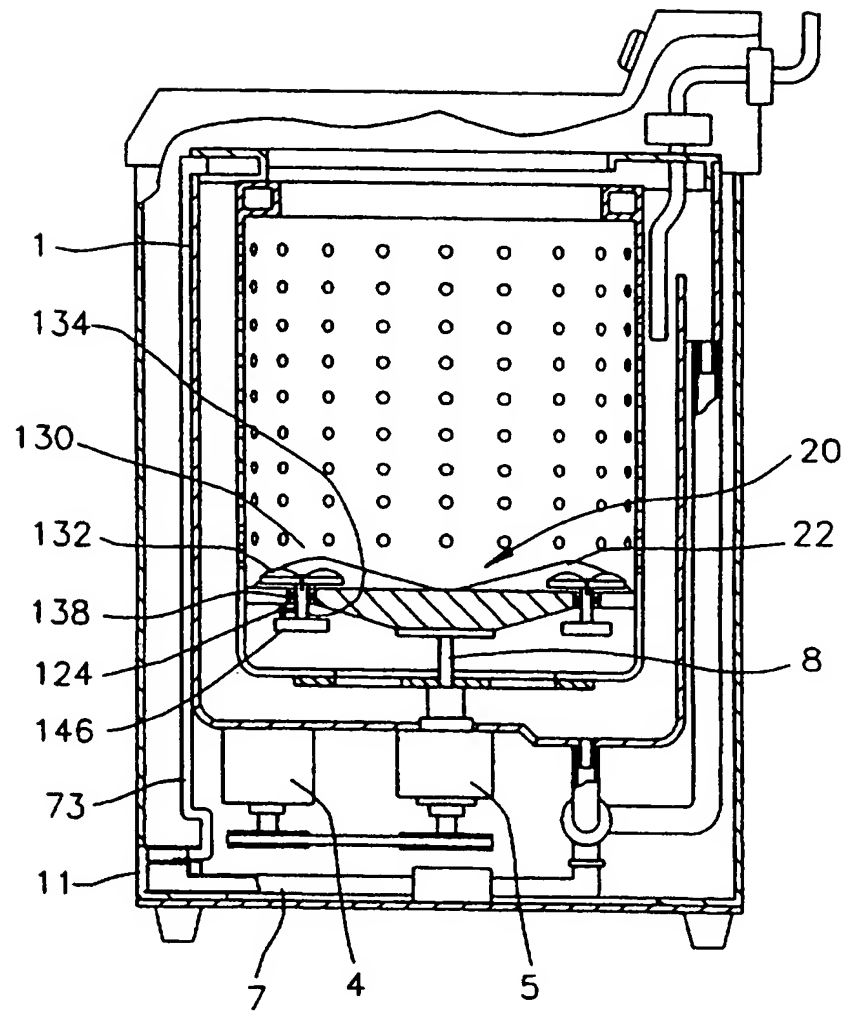


FIG 4

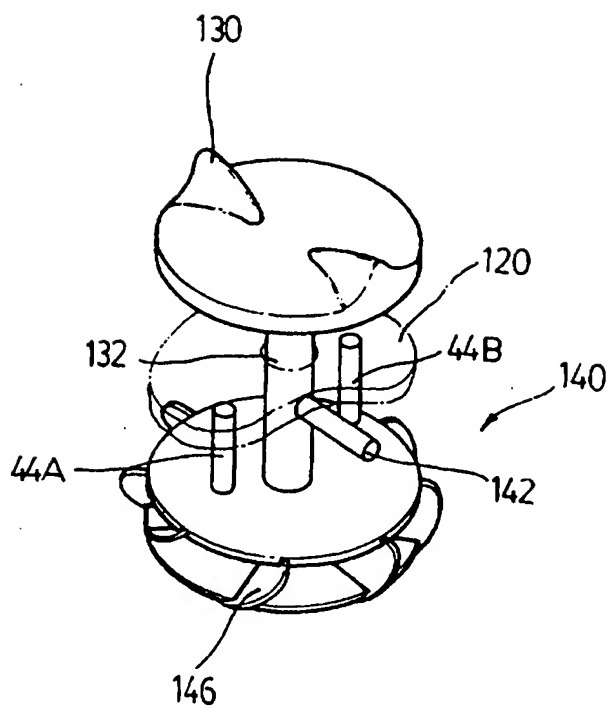
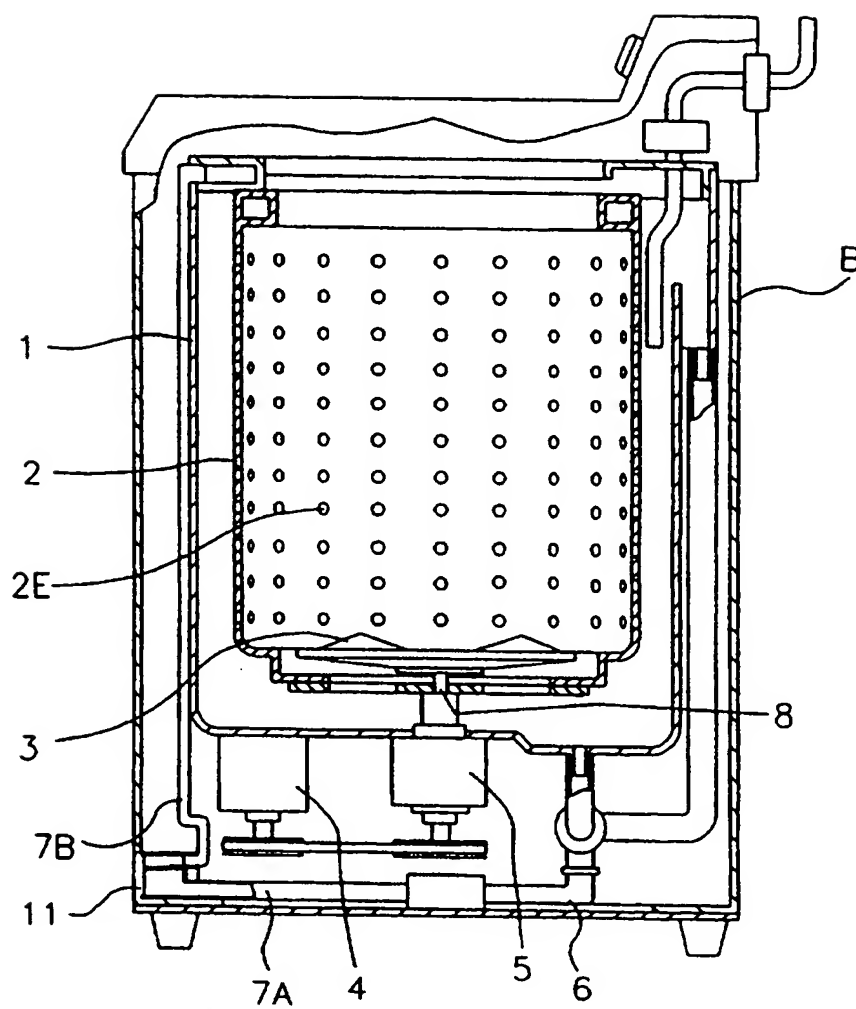


FIG.5
PRIOR ART



CLOTHES WASHER HAVING A PULSATOR APPARATUS

BACKGROUND OF THE INVENTION

5 Field of the Invention

The present invention relates to a clothes washer having a pulsator apparatus, and more particularly to a clothes washer having a pulsator apparatus in which a plurality of satellite pulsators are rotated by the
10 rotation of a sun pulsator.

Description of the Prior Art

A clothes washer is generally classified into either a drum type in which a rotational shaft of a water basket is horizontally arranged, or an agitator
15 type and a pulsator type in both of which a rotating shaft of a water basket is vertically arranged.

In the drum type clothes washer, a cylindrical drum having a plurality of water extracting openings is rotatably arranged in a water basket. During
20 operation, a plurality of projections formed in the drum pull the clothes upward, and then clothes fall by gravity so the washing process is accomplished. This washer is adapted for larger capacity washing.

In the agitator type clothes washer, a rotatable agitator mounted at the center of the clothes washer
25 is periodically rotated, and an agitating vane formed integrally on the side wall of the agitator stirs up water to form the swirling water. Clothes float in water and make frictional contact with the agitator
30 and the inner wall of the clothes basket, thus accomplishing the washing process.

In the pulsator type clothes washer, a rotatable pulsator mounted at the center of the clothes washer is rotated so the flow of water swirls, thus executing
35 a washing operation. This washer is widely utilized at

the present.

Figure 5 illustrates the typical pulsator type clothes washer. The clothes washer is comprised of a body B, a water basket 1 suspended to the body by the suspension device (not shown), and a clothes basket 2 mounted rotatably in the water basket 1. The clothes basket 2 comprises a plurality of openings 2E and a pulsator 3 rotatably mounted on the center of a bottom portion of the basket 2. Further, beneath the water basket 1 a motor 4 and a reduction gear assembly 5 are provided. The motor 4 generates the driving force, and the reduction gear assembly 5 reduces a high speed rotational force of the motor 4 into a proper speed rotational force for both the water basket 2 and the pulsator 3. The rotational force of the motor 4 is transmitted to the pulsator 3 and/or the water basket 2 by the selective engagement or disengagement of a clutch (not shown) housed in the reduction gear assembly. The pulsator 3 is connected with an input shaft 8 projected from the reduction gear assembly 5. The clockwise or counterclockwise rotational force of the pulsator 3 moves the clothes. Numeral 6 indicates a drain hose for draining water in the water basket 2, and Numerals 7A, 7B are spray hoses, respectively, for spraying the pumped water from the pump onto the clothes put in the clothes basket 2. Numeral 11 designates a filter for lint in water supplied to the spray hose.

Single pulsator is mounted at the center of the inner bottom surface of the water basket, and the pulsator is coaxially arranged with the input shaft. The rotation of the input shaft causes the pulsator to rotate. The typical pulsator is revealed in U.S. Pat. Nos. 4,444,027 and 4,496,784. However, in this washer, the water flow generated by the pulsator is

insufficiently transferred to the clothes floating
beneath the level of water. Additionally, an
ineffective water flow is provided to the side wall of
the water basket. This causes inefficient washing in
5 respect of clothes. Also the twisting and tangling of
clothes may occur.

SUMMARY OF THE INVENTION

Therefore, it is an object of the present
10 invention to provide a clothes washer having a
pulsator apparatus for improving the washing
efficiency of the washer.

It is another object of the present invention to
provide a clothes washer having a pulsator apparatus
15 for sufficiently performing the anti-twisting/tangling
operation of clothes.

In order to achieve the above objects of the
present invention, a clothes washer having a pulsator
apparatus comprises a water basket, a clothes basket
20 disposed in the water basket and including a first
pulsator, a driving mechanism for selectively driving
the clothes basket and the first pulsator, and a
plurality of second pulsators driven by the rotating
force of the first pulsator.

25 In one embodiment, the second pulsators are
driven by a gear train which converts the rotating
force of the first pulsator into mechanical force.

Furthermore, the gear train may comprise a
driving gear provided rotatably in the first pulsator,
30 and a ring shape driven gear provided in the second
pulsator and being meshed with the driving gear.

The gear train may further comprise an idle gear
formed along the tracks of the rotation of the driving
gear and meshed with the driving gear.

35 Otherwise, the driving gear may comprise a rubber

wheel.

Further, the ring shape driven gear may comprise a ring shape rubber pad.

Also, the idle gear may comprise a ring shape
5 rubber pad.

Alternatively or additionally, the second pulsators are driven by a second conversion means which converts the rotating force of the first pulsator into fluid force.

10 In one embodiment, the second conversion means comprises a turbine.

A blade of the turbine may be provided at a rotational shaft of the second pulsator.

15 BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and other advantages of the present invention will be more clarified by describing a preferred embodiment thereof with reference to the accompanying drawings in which:

20 Figure 1 is a vertical elevational view of a clothes washer having a pulsator apparatus according to an embodiment of the present invention;

Figure 2 is a plan view of the clothes washer having a pulsator apparatus shown in Figure 1;

25 Figure 3 is a vertical elevational view of a clothes washer having a pulsator apparatus as another embodiment according to the present invention;

Figure 4 is a plan view of the clothes washer having a pulsator apparatus shown in Figure 3; and

30 Figure 5 is a vertical elevational view of the clothes washer having a pulsator apparatus according to a prior art.

DESCRIPTION OF THE PREFERRED EMBODIMENT

35 Hereafter, embodiments of the invention will be

described in further detail with reference to the accompanying drawings. The component parts as those in Figs. 1 through 4 are designated by the same reference numerals as the corresponding parts of conventional embodiment of Fig. 5, so a detailed description of those parts will be omitted.

In the first embodiment as shown in Figs. 1 and 2, a driving or first pulsator 20 is rotatably mounted at the input shaft 8 of the reduction gear assembly 5 which is disposed at the central lower portion of the clothes basket 2. In the first pulsator 20, a plurality of second pulsators 30 are rotatably provided in a predetermined space. Further, a gear train is provided for transmitting the rotational force of the first pulsator 20 to the second pulsator 30.

A plurality of recesses 22 are formed on the upper surface of the first pulsator 20. A bearing hole 34 is provided at the central portion of the bottom of the recess 22 for enabling the shaft 32 of the second pulsator 30 to rotate. Further, a slot 49 is formed at the bottom portion of the recess 22 and permits a driving gear 42 of the gear train 40 to freely drive, the driving gear being explained later.

The gear train 40 is comprised of a driving gear wheel 42 receiving the rotation force of the first pulsator 20 and a driven gear 48 meshed with the driving gear wheel 42. The gear train 40 further is comprised of an idle gear 46 formed along the tracks of the rotation of the driving gear around the shaft 8.

In the driving gear wheel 42, both ends of the shaft 44 of the gear wheel 42 are rotatably inserted into both sides of the slot 49, respectively. The idle gear 46 is provided on the upper surface of the bottom

portion of the clothes basket and is formed as a ring gear meshed with the driving gear wheel 42. The driven gear 48 is provided underneath the second pulsator 30 and is formed as a ring gear around the shaft 32.

5 Alternatively, the driving gear wheel 42 can be substituted with a rubber wheel, the driven gear 48 can be substituted with a ring shape rubber pad, and the idle gear can be substituted with a rubber pad.

10 In Figs. 3 and 4 illustrating a second embodiment, a driving or first pulsator 20 is rotatably mounted at the input shaft 8 of the reduction gear assembly 5 which is disposed at the central lower portion of the clothes basket 2. In the first pulsator 20, a plurality of second pulsators 130
15 are rotatably provided in a predetermined space. A shaft 132 of respective second pulsator 130 is extended downward through a bearing hole 124 of the second pulsator 130. At the lower portion of the shaft 132 is provided a turbine 140 which rotates the second
20 pulsator 132 by the swirl of washing water.

 The turbine 140 is provided between the bottom portion of the clothes basket 2 and the first pulsator 20, and is rotated by the swirling water with respect to the rotation of the first pulsator 2. The turbine
25 140 is comprised of a plurality of blades 146 formed at the lower end of the shaft 134 of the second pulsator 132, a protruder 142 extending transversally from the middle portion of the shaft 134, and a couple
30 of stoppers 44A, 44B for restricting the rotation of the protruder 142. The stoppers are extended downward from the lower surface of the first pulsator 20.

 The clothes washer having the pulsator apparatus according to the embodiments of the present invention constructed as above is operated as below.

35 The washing mode starts according to a

predetermined program, then the operating force of the motor 4 is transmitted to the reduction gear assembly 5. The input shaft 8 of the reduction gear assembly 5 rotates, and then the first pulsator 20 rotates. Like
5 the rotation of the first pulsator 20, respective driving gear wheels 42 move simultaneously along on the idle gear 46. Thus, the driven gear 48 meshed with the driving gear wheel 42 rotates. The swirling water flow created by the rotation of each second pulsator
10 30 is combined with another swirling water flow for the first pulsator 20, which results in a greater swirling water flow.

On the other hand, in another embodiment, the swirling water flow created by the rotation of the
15 first pulsator 20 makes the turbine rotate. Thus, the shaft 134 connected to the turbine 140 rotates the second pulsator 130. The second pulsator 130 rotates respectively to the first pulsator 20 irrespective of the rotation of the first pulsator 20, thereby
20 resulting in various swirling water flows.

Further, the rotational range of the protruder 142 is restricted by the stopper 44A, 44B during the rotation of the second pulsator 130. The second
25 pulsator 130 rotating in the limited range rotates simultaneously along the rotation of the first pulsator 20. The resistant force of the water flow is applied to the stationary second pulsator 130 when the water impulse is directed onto the second pulsator
30 130. Thus, the flow direction of the water is changed due to the resistant force of the second pulsator 130, thereby resulting in various swirling water flows.

According to the embodiments of the present invention as described above, since a plurality of driven pulsators are arranged along the inner
35 circumference of the driving pulsator disposed in the

clothes basket, and the driven pulsators rotate according to the rotation of the driving pulsator, the driving pulsator and a plurality of driven pulsators generate a greater swirling water flow
5 during the washing mode, resulting in higher washing efficiency.

Furthermore, since clothes in the basket are agitated by a plurality of pulsators, twisting and tangling of the clothes is prevented.

CLAIMS

1. A clothes washer having a pulsator apparatus comprising:
 - 5 a water basket;
 - a clothes basket disposed in said water basket and including a first pulsator;
 - a driving mechanism for selectively driving said clothes basket and said first pulsator; and
 - 10 a plurality of second pulsators driven by the rotating force of said first pulsator.
2. The clothes washer having a pulsator apparatus according to claim 1, wherein said second pulsators
15 are driven by a first conversion means which converts the rotating force of said first pulsator into mechanical force.
3. The clothes washer having a pulsator apparatus according to claim 2, wherein said first conversion
20 means is comprised of a gear train.
4. The clothes washer having a pulsator apparatus according to claim 3, wherein said gear train is
25 comprised of a driving gear provided rotatably in said first pulsator, and a ring shape driven gear provided in said second pulsator and being meshed with said driving gear.
5. The clothes washer having a pulsator apparatus according to claim 3, wherein said gear train is further comprised of an idle gear formed along the
30 tracks of the rotation of said driving gear and meshed with said driving gear.

35

6. The clothes washer having a pulsator apparatus according to claim 4 or 5, wherein said driving gear is comprised of a rubber wheel.
- 5 7. The clothes washer having a pulsator apparatus according to claim 4, wherein said ring shape driven gear is comprised of a ring shape rubber pad.
- 10 8. The clothes washer having a pulsator apparatus according to claim 5, wherein said idle gear is comprised of a ring shape rubber pad.
- 15 9. The clothes washer having a pulsator apparatus according to any preceding claim, wherein said second pulsators are driven by a second conversion means which converts the rotating force of said first pulsator into fluid force.
- 20 10. The clothes washer having a pulsator apparatus according to claim 9, wherein said second conversion means is comprised of a turbine.
- 25 11. The clothes washer having a pulsator apparatus according to claim 10, wherein a blade of said turbine is provided at a rotational shaft of said second pulsator.
- 30 12. A clothes washer substantially as hereinbefore described with reference to and illustrated by any one of Figures 1 to 4 of the accompanying drawings.



Application No: GB 9716183.0
Claims searched: 1-12

Examiner: R L Williams
Date of search: 22 October 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): D1A (AEH)(AEJ)(AFD)(AFE)(AFG)(AFH)

Int Cl (Ed.6): D06F 17/00,17/06,17/08,21/06,21/08,23/04,37/40

Other: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A,E	GB 2,308,606 A Daewoo Electronics Co Ltd	1
A,E	GB 2,308,136 A Daewoo Electronics Co Ltd	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.